

## SPIRANTHES IN DOVER, MASSACHUSETTS.

HAROLD ST. JOHN.

SEVERAL times during the last twelve years the writer has collected from a grassy field forming part of his grandmother's farm in Dover, Massachusetts, specimens of a big grass-leaved *Spiranthes*. It proves to be *S. vernalis* Engelm. & Gray. By the margin of a few miles this is a new most northern station for the plant. The nearest record being that from Randolph: sandy roadside, Canton Road, Sept. 5, 1898, *J. R. Churchill*.

From the first the writer had difficulty in identifying these specimens, because the lip did not really seem to be "pubescent beneath." In those earlier years his instinctive reverence for the exact truth of all words appearing in a book, especially a botany, made the finder realize that either his eyes or the plants themselves were at fault and made him force himself to see the lip as "pubescent beneath." When last summer this plant was again collected, the discrepancy was still apparent, and this time he was in a position to consult original sources, other collections, and to review all the evidence.

Because of his own difficulties when studying this species and in the hope of helping other botanists, the writer makes a few comments on its description in the current manuals. In Prof. Ames's treatment in Gray's Manual, ed. 7, 313 (1907) the key-character leading to this species is,

"++ *Lip ovate to ovate-oblong, pubescent beneath.*"

The lip of this species is from ovate to ovate-oblong in shape, but it cannot be accurately described as "pubescent beneath." Between the two nipples on the upper side of the lip is a long white villosity. This grades off into a fine puberulence which in the immediate neighborhood of the callosities covers the upper surface of the lip, the margins and to a slight extent runs over on to the lower surface immediately beneath the callosities.

The leading phrase in the key in Britton & Brown's Illustrated Flora, i. 564 (1913) is equally inapplicable.

"Lip pubescent without, of an ovate type, the base dilated."

On the same score this also fails to describe the real condition, and one having the actual plant before him would have difficulty in identi-

ifying it properly. Both of these treatments follow closely that of Prof. Ames in his "Synopsis of the Genus *Spiranthes* North of Mexico," Ames: Orchidaceae, Fasc. i. 124 (1905) where he used a similar statement in his key:

"Lip ovate to ovate-oblong, usually equalling the sepals and petals; not laciniate at the tip, broadest in front of the callosities, pubescent beneath."

The amount and position of the pubescence on the lip of this species is well represented in an enlarged drawing on a sheet of the type number (*Lindheimer*, no. 191) in the Gray Herbarium; and in Plate 51, fig. 5, RHODORA, vi. 31 (1904). This plate, drawn by Mrs. Ames, illustrates this species in an article written by Prof. Ames in which he described it as *S. neglecta* Ames.

After further study and the inspection of additional material Prof. Ames decided<sup>1</sup> that his *S. neglecta* was identical with and would have to be placed in the synonymy of *S. vernalis* Engelmann & Gray. If the pubescence on the lower surface of the lip of *S. vernalis* is to be used as a key character to separate it from the more southern *S. praecox* (Walt.) Wats. & Coult., then the small quantity and definite localization of this pubescence should be stated. The lips of both these species are, when seen with considerable magnification, finely papillose, but this would not conceivably be confused with pubescence. The callosities of *S. praecox* are cylindrical, longer, and more divergent than those of *S. vernalis*.

In the large sloping field on the north side of Farm St., Dover, where these plants were growing, *S. gracilis* (Bigel.) Beck was abundant and growing intermingled with *S. vernalis*. There were also some plants with the grass-like leaves and the yellowish-white tinge of the corolla and the puberulent summit of the culm of *S. vernalis*; but with the more slender habit, the more slender spike with fewer looser spirals, and with the smaller corolla of *S. gracilis*. In these the lip is quite intermediate in character. It resembles that of *S. gracilis* in size and in its crisped outer margin. It has a suffusion of yellowish-green color down its centre and in the callosities, suggestive of the deep green color of the body of the lip of *S. gracilis*. The lip is narrower, being oblong (3 mm. in width) while the lip of *S. gracilis* is quadrate (4 mm. in width).

<sup>1</sup> Ames, Oakes: Orchidaceae, Fasc. i. 113-7 (1905).

Another collection of this puzzling plant (*St. John*, no. 2,046) showed likewise a blending of the characters of *S. vernalis* and *S. gracilis*, but in this case they were combined differently. The specimens resemble *S. gracilis* in the size of the corolla and the quadrate shape of the lip; they resemble *S. vernalis* in having the summit of the culm pubescent as in that species; they show characters intermediate between those of the two species in that the lip is partially suffused with green and is somewhat crisped at the margin, while the spirals of the spike are fewer and more distant than in *S. gracilis* but not as much so as in *S. vernalis*. These plants are without doubt of the same nature as those collected at Easton, Massachusetts, and described as *S. × intermedia* Ames.<sup>1</sup> As in Dover, the plants in Easton were growing in the immediate proximity of the alleged parents, *S. gracilis* and *S. vernalis*.<sup>2</sup> The second occurrence of this natural hybrid, at a different station is a noteworthy bit of evidence towards Prof. Ames's suggestion that this apparently fertile hybrid may rapidly establish itself as a distinct species. There is every reason for the supposition that at this second known station the crossing has again occurred, instead of the supposition that the plant has spread from the original station at Easton.

Close observation and study of these specimens from Dover in the fresh condition seems to confirm Prof. Ames's statement<sup>3</sup> that "*Spiranthes × intermedia* is a non-Mendelian hybrid. It is intermediate throughout, the characters of both parents being merged in all the important vegetative and floral parts."

In order to bring out any relation between the location of the hybrid plants and those of the parent species, the writer made a census of their occurrence in this part of Dover. Mrs. Everett's field in which *Spiranthes vernalis* has grown for at least twelve years is nothing but a rather dry hayfield on a gentle south slope in the western and higher part of Dover. A definite ridge running across it divides this six acre field into two nearly equal parts, one to the west, and one to the east, which is lower, with a definite gully running through it. This

<sup>1</sup> RHODORA, v. 262 (1903).

<sup>2</sup> Prof. Ames originally described *S. × intermedia* as a hybrid of *S. gracilis* (Bigel.) Beck and *S. praecox* Watson, but he later demonstrated [Ames: Orchidaceae, Fasc. i. 113-21 (1905)] that the northern plant which he had called *S. praecox*, should be treated as *S. vernalis* Engelm. & Gray. Hence the hybrid *× S. intermedia* Ames is to be considered as one between *S. gracilis* (Bigel.) Beck and *S. vernalis* Engelm. & Gray.

<sup>3</sup> RHODORA, v. 263 (1903).

eastern section of the field is moister and produces a more luxuriant stand of grass and a larger number of the *Spiranthes*. In the thorough search it was discovered that these orchids also occurred in a nearby, but not contiguous, hay field belonging to Mr. Gardner. Mrs. Everett's field has to the author's certain knowledge been continuously cultivated for over fifty years, and probably much longer than that, for it has been in the possession of the same family for five generations. One would never think of inspecting such fields as these in search for orchids. It is of course their late blooming that allows them to exist here. After the hay has been cut, they send up their stalks and come into flower undisturbed about the first week of September. How the plants survive the occasional plowing is more of a mystery. The relative abundance of these plants in the three areas is brought out in the following table.

Species	Number of plants in western part of Everett field.	Number of plants in eastern part of Everett field.	Number of plants in Gardner field.
<i>S. vernalis</i> .	1	44	38
× <i>S. intermedia</i> .		9	1
<i>S. gracilis</i> .	36	295	19

In the eastern part of the Everett field both of the species *S. gracilis* and *S. vernalis* are not only more abundant than in the other localities, but they grow much closer together. Hence in this area a visiting bee would have a greater chance of making a mistake and, with the boat-shaped scale together with its attached pollinia of one species glued to his proboscis<sup>1</sup> he would occasionally fly to the lowest flower of a spike of the other species. Here he would climb up the spiral flowery staircase stopping at each landing to sip of the nectar and fertilize the stigma with the foreign pollen that would give rise to more plants of × *Spiranthes neglecta* Ames.

#### GRAY HERBARIUM.

<sup>1</sup> For a description of the method of the cross fertilization of the flowers of this genus and of *S. gracilis*, see Darwin, Charles: *Fertilization of Orchids by Insects*, 2nd ed. 105-14 (1877); and Robertson, Charles: *Flowers and insects*. ix., *Bot. Gaz.* xvii. 51-2 (1893).